

Provisional Application of  
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For

## **Vehicle Security System**

**Related Application  
Priority as claimed under 35 USC 119/e for  
Provisional Patent Application 60/470566, filed May 14, 2003**

### **Summary of Invention**

The present invention relates to interacting with a security system through a watch interface. The watch will be comprised of a display screen(s) that will show digital read-outs of the security system's status. The invention comprises relaying regular watch functions (time, date, etc.) also on a display screen(s).

## **Background – Field of Invention**

This invention relates to security systems for vehicles and will later expand to homes. A user of the remote watch will not only be able to keep track of the time but also will be able to arm/lock, disarm/unlock and remotely start their vehicle by pushing specific buttons on the watch. It is common for people to lose or misplace their keys along with the keyless remote that is attached to the keys. Since the watch is placed on the users wrist, the user never has to worry about damage due to dropping it on a hard surface, in liquids (ex. water), or even losing their keyless remote as you would by having a keyless remote attached to keys or a key chain.

## **Background – Prior art (Discussion and Criticism of the relevant prior art)**

Some of the latest inventions in the field of car security have been the 2-way transceivers.

They comprise of:

- i. A display screen
- ii. 4 buttons
- iii. A small antennae

The 2-way transceiver remote confirms that your vehicle has received signals and alerts the user to system triggers and theft attempts. This remote can display 20 different icons including transmit, receive, remote start, arm/disarm, hood, trunk, door ajar, and extra sensors. The Auto Security Compustar is a semi-small remote start keyless entry that displays a car on the screen and shows the part of the car that is being tampered with.

These particular devices look like toys. They both still hold true to the traditional keyless entry remotes that can be attached to a key chain and possibly damaged by those people who toss their keys around and lost by those who are careless. It is also not waterproof as our invention can be and will not have the style along with convenience, as our invention will.

### **Objectives and Advantages (positive aspects of invention)**

- The advantages of this invention are:
  - i. Digital or analog or a combination of digital/analog
  - ii. Linking the individual to his/her vehicle at all times
  - iii. Vibrates/beeping sound to alarm an individual whenever the vehicle is being tampered with and when the alarm is triggered.
  - iv. The watch gives you feedback by transmitting the condition of the vehicle.
  - v. This invention is located in the most convenient and easy to access area, the user's wrist. Having the device on the wrist will allow hassle-free convenient usage. Other car security devices have to be pulled out of a pocket, bag, or another area.
  - vi. The watch displays the time.
  - vii. Keeps track of time and a vehicle at all times.
  - viii. If you loose your keys you will also loose your keyless entry alarm remote. Since the security system is located on the watch, a person does not have to worry about losing the keyless remote.

ix. If you lose your keys then a person can feel safe about leaving a spare key in the car because they will still be able to unlock and disarm the security system from the remote watch which is worn on your wrist and not attached to the keys which can be lost.

### Drawings & Figures

Figure 1 Block Diagram of Digital Watch Remote Security System

Figure 2 Block Diagram of the Digital Watch Remote

Figure 3 Basic Outline of Switching Device

Figure 4 EnMOSFET Switch (EACS) Diagram

Figure 5 Small AC Equivalent Output Circuit

Figure 6 Block Diagram of EACS Controlled Switch System

Figure 7 Side view of the watch, which is a basic means for controlling the security system.

Figure 8 Frontal/top view of the means for controlling the security system.

Figure 9 Frontal and side view of a prototype means for controlling the security system.

Figure 10 Frontal view of the means for controlling the security system.

### Reference Numerals

#### Figure 1: Block Diagram of Digital Watch Remote Security System

100-Controller Processing Unit	115-Valet Switch
102-Remote Watch	116-Window Control
101-Antenna	117-Panic Output
104-Memory Unit	118-Starter Kill
105-Timer	119-Disarm Output
106-Trigger and Sensor Circuitry	120-Armed Output

107-Proximity Detector	121-Automatic Starter
108-Transceiver	122-Character Display
109-Input Interface	123-Dome Light
110-Output Interface	124-Valet/Dashboard LED
111-Ignition Switch	125-Park Lights
112-Trunk Switch	126-Siren
113-Hood Switch	103-Operational Signal
114-Door Switch	

#### Reference Numerals

**Figure 2: Block Diagram of the Digital Watch Remote**

200-Watch Remote Console	207-Control Section
201-Keypad	208-Timer
202-Liquid Crystal Display	209-Mode Controller
203-Memory	210-Code Generator
204-Date(Month/Day)	211-Transmission Section
205-Time(Hour/Minute)	212-Code Data
206- Buzzer	

#### Reference Numerals

**Figure 3: Basic Outline of Switching Device**

300- Watch & Remote Control Transmitter	302- Switch select lines
301- Switching Circuitry	304- Select Switching Lines

#### Reference Numerals

**Figure 4: EnMOSFET Switch**

400-Switched Circuit	403b-Gate of enhancement MOSFET switch
401-Low voltage terminal of the switch	403c-Drain of enhancement MOSFET switch
402-High voltage terminal of the switch	404-2kΩ Resister

403-n-channel enhancement MOSFET	405-Power Source
403a-Source of enhancement MOSFET switch	

#### Reference Numerals

**Figure 5: Small AC Equivalent Output Circuit**

500a-What the AC output circuit is connected to	504a-2kΩ Resister
500b- What the AC output circuit is connected to	504b-2kΩ Resister
501a-High voltage terminal of switch (on)	505a- Drain of enhancement
	MOSFET switch (on)
501b- High voltage terminal of switch (off)	505b- Drain of enhancement
	MOSFET switch (off)
502a-Low voltage terminal of switch (on)	506a-Source of enhancement
	MOSFET switch (on)
502b- Low voltage terminal of switch (off)	506b- Source of enhancement
	MOSFET switch (off)
503a-RDS on – On position resister	503b-RDS off – Off position resister

#### Reference Numerals

**Figure 6: EACS Controlled Switch System**

600-3V Battery voltage	605a-Voltage for Low Line 8 to 1 Multiplexer
601-Remote transmitter circuit	606- Low voltage terminal of the switch
602-Watch Circuit	607- High voltage terminal of the switch
603a-High voltage lines for the watch circuit	608-Voltage for EACS Switch
603b-Low voltage lines for the watch circuit	609-EACS Switch
604a-High voltage lines for the Remoter	610- Gate of EACS switch
Transmitter circuit	
604b-Low voltage line for the Remote Transmitter	611- High Line 8 to 1 Multiplexer
circuit	
605-Voltage for High Line 8 to 1 Multiplexer	612- Low Line 8 to 1 Multiplexer

**Reference Numerals**

**Figure 7: Flip-up Watch Remote Drawing**

701- Exterior Digital Clock	705-Entire Flip-up component
702- Interior Display Screen	706-Base
703- Interior Display Screen	707-Mode Button
704- Keypad	708-Select Button

**Reference Numerals**

**Figure 8: Flip-up Watch Remote Drawing**

801- Exterior Digital Clock	805-Entire Flip-up component
802- Interior Display Screen	806-Base
803- Interior Display Screen	807-Mode Button
804- Keypad	808-Select Button

**Reference Numerals**

**Figure 9: Basic Watch Remote Drawing**

900-display screen	904- remote start
901-light	905- arm/lock
902- disarm/unlock	906-base
903- panic	907- mode

**Reference Numerals**

**Figure 10: Button Description of Watch Remote**

1001-outside digital clock	1015-numeric 7/letters Q,R
1002-display screen	1016-numeric 8/letters S,T
1003-display screen	1017- numeric 9/letters U,V,W
1004-keypad (touch buttons)	1018- numeric 0/letters X,Y,Z

1005-entire flip up component	1019- numeric 4/letters I,J
1006-base (where battery and other internal components are stored)	1020- numeric 5/letters K,L
1007-side button (mode)	1021- numeric 6/letters M,N
1008-side button (open	1022- up scroll/letters O,P
1009-side button (light)	1023- numeric 1/letters A,B
1010-side button (select)	1024- numeric 2/letters C,D
1011-remote start	1025- numeric 3/letters E,F
1012-arm/lock doors	1026- down scroll/letters G,H
1013-disarm/unlock doors	1027- hinge
1014-panic	

**Description –Main Embodiment (narrative of the structure)**

Figure 7 shows the side view of the remote watch. The digital clock **701** located on the outside surface of the flip-up component **705** will display watch information such as the time and date. The interior display screen **702** located on the base **706** of the watch remote will display the time and alternative watch functions (calendar, schedule, etc.). The interior display screen **702** is displayed when the flip-up component **705** is opened. The display screen **703** located on the inside of the flip-up component **705** will display feedback of various car functions. For example, if the armed button is pressed, the display screen **703** will display feedback information for the car alarm functions related to arming the vehicle.

. Figure 8 shows the same version of the watch from a frontal/top view displaying the entire flip up component **805**, the hinge **827** whereby the said flip up component **805** will be able to be attached to the base **806** and flip upward showing the interior components. The entire flip up component **805** that contains an outside digital clock display **801**, an interior display screen **803**, and base **806**. The said flip-up component **805** is preferably made of stainless steel and has a thickness less than that of the

base 806. The outside display clock 801 will preferably be a liquid crystal display screen, where the width of the screen will be the same as the interior display screen 802. The length of the said outside display clock will be less than half of the interior display screen or at least 1.0 cm long. The interior display screen 802, a display screen 803, and a keypad 804 are visible when the said flip up component 805 is opened. Both the interior display screen 802 and the other display screen 803 will also be liquid crystal display screens. Display screen 803 will show the functions of the car alarm (ex. If the alarm is armed or disarmed, remote started, sunroof open/closed, etc.). A display screen 802 is shown directly below the said display screen 803 as seen in figures 7 and 8. Display screen 802 will display the time, date, and calendar that are accessed through the use of the mode button 807

### **Operation –Main Embodiment (How it works)**

#### **Explanation of Circuits**

Figures 3, 4, 5, & 6

This design assumes the main source of power is a 3 V DC supply for a watch circuit and for a remote control transmitter circuit. It is assumed that eight single-post-single-single-throw switches are available, each connected to some switched circuit and each with a low voltage terminal and a high voltage terminal. The circuit works for a low voltage terminal post that is approximately at ground potential and for small AC signals at open-circuited switch terminals. The  $L^{\text{th}}$  pair of switch lines are connected to an impedance ( $Z_{SDL}$ ) that models the  $L^{\text{th}}$  switched circuit,  $L \in \{1, 2, \dots, 8\}$ .

#### **Figure 3**

By assumption, eight switches are available from two systems: the watch and the remote control transmitter 300. The switching circuitry 301 enables the selection of any one of the eight pairs of lines 304 across which a switch can be placed. This selection occurs by placing a three-bit binary address on the switch select lines 304. In addition, the switching circuitry 301 develops an electronic switch that opens and closes, placing it across the selected pair of lines (the  $L^{\text{th}}$  lines).

**Figure 4**

Normally a mechanical SPST switch with two terminals is connected to a “switched circuit **400**.” This switch is removed, replaced by an electronic switch **403**. The electronic switch **403** consists primarily of an enhanced metal oxide semiconductor field effect transistor (EnMOSFET). The EnMOSFET switch consists of a source **403a**, gate **403b**, and drain **403c**. The EnMOSFET AC Switch (EACS) circuit indirectly connects the high **402** and low **401** terminals of the switch for small AC signals. The  $2k\Omega$  resistor **404** on the drain provides on-state protection, and determines a DC quiescent point.

**Figure 5**

**A & B**

Figure 5a shows the EnMOSFET switch connected to the AC output **500a**. When the gate voltage of the EnMOSFET switch is high **501a** ( $\sim 3$  V), turning the transistor on, an AC ground exists on the drain **505a** terminal of the FET placing the drain **505a** and source **506a** at approximately the same potential. Figure 5b is the closed circuit condition of the electron switch. When the gate voltage is low **502b**, AC current flow discontinues resulting in an open circuit or the open electron switch **503b** condition. The  $2k\Omega$  resistor **504b** on the drain provides on-state protection, and determines a DC quiescent point.

**Figure 6**

This design assumes the main source of power is a 3 V DC **600** supply for a watch circuit **602** and for a remote control transmitter **601** circuit. It is assumed that eight single-post-single-single-throw switches are available, each connected to some switched circuit and each with a low voltage terminal (**603b** & **604b**) and a high voltage terminal (**603a** & **604a**). The switching circuitry primarily consists of the EACS **609** and two multiplexers. Two 8-to-1 multiplexers operate in parallel sharing the same address lines (switch select lines). One multiplexer **611** selects the high potential terminal of the  $L^{\text{th}}$  switch and the other **612** selects the low potential terminal. The EACS **609** produces the opening and closing actions of the switch.

## **Operation**

**Figure 2**

**Watch Transmitter**

The remote watch car alarm system includes the watch (see Fig.2) and an onboard control module (see Fig 1). The watch that is worn by the vehicle owner/operator consists of an LCD screen **202**, operational keypad **201**, code generator **210**, mode controller **209**, memory **203**, timer **208**, transceiver **211**, and buzzer **206**. The onboard module (see fig 1) will consist of a controller processing unit **100** or a microprocessor program controller, timer **105**, memory unit **104**, transceiver **108**, proximity detector **107**, sensor zone circuitry **106**, input interface **109**, and an output interface **110**.

Referring to the schematic block diagram of FIG. 2, the remote watch includes a liquid crystal display **202** for displaying such information as the time, date, Mode State of the watch, and preset alarm times. The said watch will also include an operational keypad **201** for entering a variety of functions including, information for the date and time or car security functions such as arm/disarm, remote start and etc.

The control section **207** of the watch has a mode controller **209**, code generator **210**, and an alarm timer **208**. The mode controller **209** sets the mode in which the watch will operate. The code generator **210** inputs code data **212** to the circuitry of the transceiver **211**. The timer **208** will cause the mode controller **209** to switch back to the watch setting (mode) after a car security button is pressed on the keypad **201**. The timer **208** will then alert the user when an alarm time is activated via the buzzer **206**. As would be readily understood by those skilled in the art.

The digital remote watch further includes memory (**203**) and a buzzer (**206**). The memory **203** will be used for storage of data such as the set alarm generating time (wake-up alarm), the mode being currently affected, the month, day, year data, and the time (hour/minute). The buzzer **206** will chirp with the corresponding car security functions (ex. arm/disarm) as well as with (wake-up) alarm settings.

## Operation

**Figure 1**

### **Onboard Control Module**

Referring to Fig. 1, the operational signal 103 from the digital watch remote 102 is received by the external antenna 101 then the transceiver 108 receives the amplified signal from the transmitting/receiving antenna 101 and feeds the received operational signal to the proximity detector 107. The proximity detector 107 verifies the interrogating signal, detects the level of received operation signal, generates a proximity signal when the signal is above a predetermined level, the detector then feeds the proximity signal to the controller processing unit 100.

The controller-processing unit 100 generates a series of control signals or pulses as its outputs. These include activities such as locking the doors and arming the system. For example, arming the system causes a flash of the automobile parking lights 125, a single chirp from the siren 126, and causing the flashing the interior LED 124 status indicator to activate. Additionally, arming the system causes the starter 118 to be cut and if the interior dome light 123 is on, to turn it off, as would be readily understood by those skilled in the art.

The timer component 105 measures a preset time and is set and/or reset under the control of the controller-processing unit 100. The memory 104 functions as an internal memory for the controller-processing unit 100 or as an auxiliary memory for other components or devices incorporated in the system. Data writing to or reading from the memory is performed under the control of the controller-processing unit 100. This is readily understood by those skilled in the art.

As illustrated, the input interface 109 is connected to various vehicle inputs including an ignition switch 111, trunk switch 112, hood switch 113, door switches 114, key in ignition switch, pre-warm sensor, valet switch 115 and zone sensors 106. The sensor zone circuitry 106 performs the security function of the automobile. When the sensor zone circuitry 106 detects touching, it generates a signal and feeds it directly to the controller-processing unit 100. As would be readily understood by those

skilled in the art, other inputs are also contemplated by the present invention and are described by the term sensor.

The output interface 110 of the controller-processing unit 100 can be connected to a variety of output devices. The outputs may include and not limited to auxiliary relays such as window control 116 or remote start 121, as would be readily understood by those skilled in the art. Other outputs include a panic output 117, starter kill 118, disarm/arm outputs 119/120, dome light 123, parking lamps 125, siren 126, alphanumeric character display 122, and valet/dashboard red or green emitting LED's 124.

## Operation

### Figure 9

#### Basic Design

Figure 9 shows a prototype of the watch from a top view and a side view showcasing buttons for the security system and display screen. The manner of using the watch remote security system is simple, the security system can be armed by pushing the arm button 905 and disarmed by pushing the disarm button 902. The panic button 903 will cause the alarm to sound when pushed. The mode button 907 will enable a person to change the time/date. The light button 901 will illuminate the display screen(s).

## Operation

### Figure 10

#### 3 Display Screens Design

Figure 10 shows a version of the watch from a frontal and top view showcasing the entire flip up component **1005**, interior display screen **1003**, interior display screen **1002**, buttons **1007**, **1008**, **1009**, **1010** and keypad **1004** in detail. The manner of using the digital car alarm watch remote begins while the watch is closed. The flip-up component **1005** will lie on top of the base **1006**. The base **1006** encompasses the battery, circuit board, wiring, mounting for a keypad **1004**, and docking area for a display screen **1002**. The outside of the digital clock (not shown here but on Figure 7 Reference Numeral 1) will be on the outside of the said flip-up component **1005**. Flip-up component **1005** will be attached by a hinge **1027** to base **1006**. When the open button **1008** is pressed, the hinge **1027** will allow the flip-up component **1005** to open and showcase a display screen **1003**. Display screen **1003** will show the functions of the car alarm (ex. If the alarm is armed or disarmed, remote started, sunroof open/closed, etc.). The said display screen is where the regular watch functions such as the time, scheduling, a calendar and memos, can be changed/updated through a menu selection screen. For example, if a user wants to change the time on display screens **1002** and **1001** (see figure 7 & 8), they would do so through the menu selection screen on said display screen **1003**. The user will use the mode button **1007** to switch the function of the watch using the directional buttons **1022 & 1026** to navigate through the menu options, and the select button **1010** or the tri-functional button **1018** will be used to select a particular menu option. A display screen **1002** is shown directly below the said display screen **1003** as seen in figures 7 and 8. Display screen **1002** will display the time, date, and calendar that are accessed through the use of the mode button **1007**.

Below said display screen **1002** is a keypad **1004** that will allow the user to control the functions of the car security system. Through the use of keypad **1004** the functions of the car security system can be activated. The following will describe buttons dedicated to functions relating to the car security system. The remote start button **1011** will start the user's vehicle; arm/lock button **1012** will arm the security system and lock the user's vehicle. The disarm/unlock button **1013** will disarm the car security

system and unlock the vehicle; the panic button **1014** will cause the car security alarm to activate when depressed. Reference numerals **1015-1021** are alpha/numeric buttons which are used for inputting numbers/letters for the setting of time, date, names, changing the date, telephone numbers, etc. Reference numerals **1022 & 1026** are the alpha/directional buttons, which navigate the user through the digital security watch's menu functions. Button **1018** is a tri-functional button that allows the user to select a menu option, input the number 0, or the letters XYZ.

The buttons located on the side of the base **1006** are other functional buttons for the general operation of the watch. The light button **1009**, when depressed will provide backlight for all display screens (Reference numerals **701, 702**, and **703** Figure 7). The mode button **1007** will allow the user to switch from the security functions to the watch functions (time, date, telephone etc.) or vice versa, and the select button **1010** will activate one of the mentioned functions. (ex. once the mode button is touched the display screen **1003** will show "watch functions" and "security functions"; the user will then utilize the up or down scroll buttons **1022** and **1026** to highlight the function and then will utilize the select button **1010** or **1018** to select the function to be entered.)

#### **Conclusion, Ramifications, and Scope of Invention**

The remote watch security system provides a very reliable, economical device that can be used by persons of almost any age, linking the individual to his/her vehicle at all times, giving feedback on the condition of the vehicle and vibrating or beeping to alarm the individual that their vehicle is being tampered with. While the above description contains many specificities, these should not be construed as limitations on the scope of the invention, but rather as an exemplification of one preferred embodiment thereof. Many other variations are possible that we did not consider important enough to

show in drawing and describe in detail in our description. For example, this device can have minor variations in color, size, and materials. Furthermore, the digital watch can have variations in these areas:

- the wrist bands can be synthetic in different colors, or metallic (ex. Titanium)
- the entire watch transmitter can be metallic
- the display screen can light in various colors (ex. Red, green, yellow etc.)
- entire watch remote can be hard plastic with a synthetic band
- the watch transmitter can be made in various shapes and sizes (ex. Round, rectangular, square etc.)
- the flip up component can have an outer digital display clock or not
- the watch transmitter can have a flip up component or not
- the flip up component can have an analog watch face with short hand and long hand on the outer part of the flip up component and a display screen on the interior part of the flip up component
- the keypad can be arranged in many ways and the buttons can be in various shapes, sizes, and made from different materials (rubber, plastic, metal alloy, etc.)
- the keypad can be used for various functions related to the watch and the security system
- the outer buttons on the sides of the watch transmitter can be in different shapes, sizes and colors and can be used for various functions
- the range in which the watch remote can control the security system can be changed (ex. extended for longer range)
- the watch transmitter can incorporate different trademarks and logos of designer watch, clothing, and automotive manufacturers
- the watch transmitter can have automatic sliding components
- the watch transmitter can have voice commands (ex. through the use of voice command the security system can be armed/locked, disarmed/unlocked, remotely started etc.)

- the display screen can be in various sizes
- the program of the watch can have a menu selection screen with various options to cycle through
- the digital watch remote will be able to operate other power functions for different vehicles (ex. Power rear gate and power side sliding doors for mini-vans).
- The battery can be a rechargeable Ni-Cd battery that allow for extended battery life and lower maintenance cost for the user.
- Watch transmitter can be solar powered

Thus, the scope of the invention should be determined not by the embodiment(s) illustrated, but by the appended claims and their legal equivalents.

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